Draft Agenda
EPA/CPG Modeling Meeting
November 14, 2013
HQI Office, Mahwah, NJ

1. Introduction (10 min) – Ray Basso/Rob Law
2. Overview of the CPG's LPR Model Development (15 min) – John Connolly

CPG made code changes to RCATOX to incorporate fluff layer.
CPG wants to restrict desorption off resuspended sediments (because equilibrium assumptions don't apply to particles that are resuspended into water column then fall back in short time).

3. History of Interactions with EPA on LPR/NB Model Development (20 Min) – Rooni Mathew and Peter Israelsson

How does EPA reach a point where we can approve the model CPG has been working on?

4. Hydrodynamic and Sediment Transport Model (30 min) – Rafa Canziares/Rooni Mathew
    a. Relationship to the EPA model (history, differences material to projection differences)
    b. Working LPR/NB Model Status When Used for Initial Projections of Remedy Effectiveness
    c. Current Status

Coupled vs decoupled hydrodynamic-sediment transport models – CPG characterizes as 2ndary difference.
Work to be done:
- ST model simulated particles coming in over Dundee Dam as mostly clay (no contaminant partitioned on them), but data collected show more silt class. May bring back "pumping effect" (routine tidal exchange of parent bed with water column pumps out highly contaminated parent bed into water column) that CPG was trying to mitigate.

NJDEP asks about sea level rise – Connolly says it can be a sensitivity run (20 cm rise in water level over 45 years).

CPG has fixed excessive amounts of deposition at RM7.5. Previously, only 6 grid cells represented transition from channel to mudflat as U shape. Now, altered representation to give more distinct channel cells vs. mudflat cells, so it has more steep V shape.

Fluff layer in ST model does not communicate with F&T model fluff layer. But is CPG working on changing this? Hard to tell.

5. Contaminant Fate Model (60 min) – Peter I/Pete Oates/Wen Ku
    a. Relationship to the EPA model (history, differences material to projection differences)

b. Working LPR/NB Model Status When Used for Initial Projections of Remedy Effectiveness
c. Current Status

CPG divides channel by deposition history in the lower LPR, and by sediment texture in upper LPR.
CPG used EPA boundary conditions – what does this mean?
Differences between EPA and CPG RCATOX models in
- resolution of domain
- CPG model turned off volatilization
- mixing parameterization in bed
- how deposition/erosion is handled

Domain:
- extent of domains is same, but resolution of RCATOX is different (CPG uses same # of cells-1942- in RCATOX as ST model, EPA has grid collapse to 764 cells in RCATOX)

CPG: Volatilization turned off to simplify, for Woolford presentation; not expected to be significant sink for TCDD given hydrophobicity. Volatilization will be included in future runs for call COPCs.

Partitioning coefficients:
- RCATOX is equilibrium partitioning model. EPA & CPG models use same partitioning coefficient values for organic compounds such as 2378TCDD & Tetra-PCBs. Recent HV-CWCM sampling confirms model partition coefficient values.
- If desorption time > residence time, then equilibrium assumption is faulty. Equilibrium assumption leads to unrealistic mass transfer during tidal resuspension (type of "tidal pumping" within F&T model). Clay particles are slowly settling, so come into newly resuspended silt particles, contaminants are transferred from silt to clays, then clays leave system carrying contamination away, silts resettle "cleaner". So CPG decided to ignore sorption to clay particles in water column, so forces silt chemicals to stay associated with silt.
- This change made trajectory from 1995-2010 shallower, better matching data.
- Note Ed Garland's question: if this is such a big issue, why are CPG & EPA MNR trajectories so similar, despite this issue?

OC parameterization different.

Mixing: highly depositional areas -> deeper/stronger mixing
non-depositional areas -> shallower/weaker mixing
- Boudreau, 1994 showed mixing intensity varies with sedimentation rate (marine seds) [related to Carbon flux?]. Areas that have higher carbon deposition have higher mixing rates and deeper mixing.
- CPG treats this as knob to calibrate model. Based on bathymetry changes, divided river into areas as "erosional", "mildly depositional", "highly depositional".

Erosion/Deposition:
- EPA uses net carbon flux, CPG uses gross carbon flux (doesn't have big effect)

- Found in data that 2378TCDD conc in 15cm surface sed > conc on particles suspended in water column.

6. Projections of Remedy Effectiveness Using Working LPR/ NB Model (45 min)
    a. Sediment COPC concentrations at start
    b. Assumptions about hydrodynamics and sediment transport
    c. Assumptions about boundary conditions
    d. Method for simulating active remediation
    e. Design of the targeted remedy
    f. Initial projection results presented to EPA and others
    g. Ongoing efforts

Initial conditions (2378TCDD concs at start of projections):
- EPA starts projections in 2011, CPG starts projectsion in 2012.
- EPA initial conditions go from 1995-2010 (using data from 1990-1995). CPG goes from 2010-2012 (using data from 2000s for surface, 1991-2000s for subsurface).

Hydrodynamic-ST model results in future, re-cycle 15 year model run – same for EPA and CPG.
- CPG no adjustment of bed elevation due to dredging, EPA does.
- CPG no solids release during dredging means overestimate amount of recontamination, because contaminants released during dredging attach to solids in water column …???
- CPG does not change fOC in backfilled/cap (use MNR fOC), which also leads to more recontamination. Do not change bed properties from native sediments for cap material.

CPG remediation schedule takes into account need to downsize dredging equipment above RM5? Is there a limit that has to be abided by?

CPG simulated partial cell remediation (required minor code modification) for Targeted Remedy.

7. Food Web Bioaccumulation Model (45 min) – John Toll
    a. Relationship to the EPA model (recognizing that EPA in essence relies on a simple BSAF for the FFS)
    b. Working LPR/ NB Model Status When Used for Initial Projections of Remedy Effectiveness
    c. Current Status
    d.

CPG Participants

Doug Reid-Green	Mike Barbara	Rooni Mathew
Gary Fisher	John Connolly	Peter Oates
Hank Martin	Rafa Canziares	Wen Ku
Tal Ijaz	Peter Israelsson	Rob Law